REMARKS

Claims 1 – 21 and 50 – 51 are pending in the present application. Independent Claims 1, 5, 6, 12, 16, and 17 have been amended herein to further clarify certain patentable distinctions over the cited references. No new matter has been added by the claim amendments.

Applicants submit that the cited references do not teach all features of the present claims and, moreover, that several of the cited references teach away from the claimed features. Accordingly, reconsideration and allowance of the pending claims are requested in view of the above amendments and the following remarks.

The Applicants thank Examiner Kibrom Hailu for the telephonic interview conducted with Applicant's representative, David Purks on July 12, 2010, regarding the rejection of independent Claim 1. No agreement was reached on the allowability of the claims. Examiner Hailu offered to reconsider the present rejections in view of any further claim amendments upon the filing of a RCE.

I. Status of the Claims:

Claims 1, 2, 4, 9, 10, 11-13, 15, 20, 21, 50 and 51 stand rejected under 35 USC 103(a) as being unpatentable over Christodoulides et al. (US 6,665,361 B1) in view of Mowbray et al. (US 6,119,263), further in view of Miyoshi et al. (US 7,372,908 B2) and in further view of Raleigh et al. (US 6,158,041).

Claims 3 and 14 stand rejected under 35 USC 103(a) as being unpatentable over Christodoulides et al. in view of Mowbray et al., Miyoshi et al., Raleigh et al, and Mogre et al. (US 20040047433 A1).

Claims 5, 6, 16, and 17 stand rejected under 35 USC 103(a) as being unpatentable over Christodoulides et al. in view of Mowbray et al., Miyoshi et al., Raleigh et al, and Gardner (US 5,627,499).

Claims 7 and 18 stand rejected under 35 USC 103(a) as being unpatentable over Christodoulides et al. in view of Mowbray et al., Miyoshi et al., Raleigh et al, and Kim et al. (US 6,851,085 B2).

Claims 8 and 19 stand rejected under 35 USC 103(a) as being unpatentable over Christodoulides et al. in view of Mowbray et al., Miyoshi et al., Raleigh et al., and Love et al. (US 7,158,482 B2).

II. Independent Claims 1 and 12 Patentable:

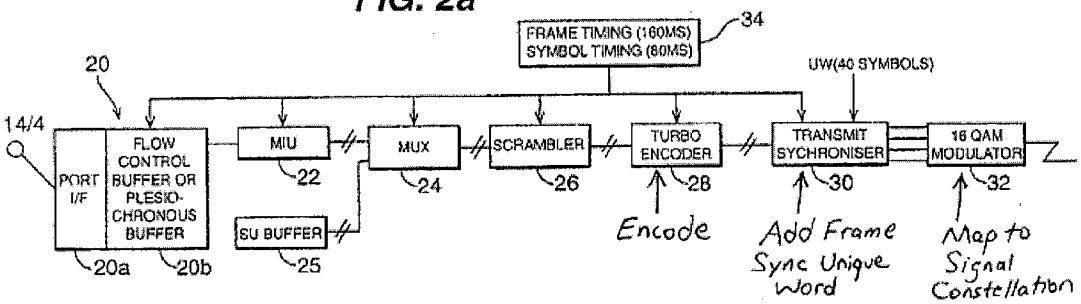
Some embodiments of the present invention are directed to performing frame synchronization of block coded data before the block coded data is decoded. The Specification explains in paragraph 5 that frame synchronization of block coded data can be particularly challenging "when the receiver has to determine which modulation and coding is used among a vast amount of potential combinations of modulation and coding schemes." The "conventional wisdom has been that because the MODCODE [MODulation CODE] field 401b [for block coded data] varies with the information being carried, such physical layer signaling information field 403 cannot be used for frame detection." (Specification, paragraph 50) However, "according to one embodiment of the present invention, a mechanism is provided to form a structure within the MODCODE field 403 that can be easily leveraged for detection purposes, without compromising error correction capability of the MODCODE field 403."

Claim 1 has been amended to emphasize that a frame synchronization structure is formed in the multiplexed data streams through the recited constellation mapping, duplication and demultiplexing, modification of the first data stream, and multiplexing of the modified first data stream with the second data stream. Claim 1 has been further amended to clarify that the data stream output from the constellation mapping is duplicated and demultiplexed to form first and second data streams that are the same as each other. In particular, amended Claim 1 recites (bracketed numbering added):

> 1. A method for supporting frame synchronization in a digital communication system, the method comprising the steps of:
> (1) mapping a codeword specifying framing information of a frame according to a signal constellation to output a data stream;
> (2) duplicating and demultiplexing the data stream into a first data stream and a second data stream that are the same as each other;
> (3) modifying the first data stream according to a predetermined operation;
> (4) multiplexing the modified first data stream with the second data stream to form a frame synchronization structure in the multiplexed data streams; and
> (5) outputting a physical layer signaling header corresponding to the frame based on the multiplexed data streams.

The Final Office Action on pages 4-5 contends that Christodoulides discloses steps (1) and (5), and concedes that Christodoulides does not disclose steps (2), (3), and (4). Referring to Christodoulides' Fig. 2a (annotated below), Christodoulides discloses that data is turbo encoded (i.e., Turbo Encoder 28), a unique word (UW) is then added to the coded data (i.e., Transmit Synchroniser 30) for use in frame synchronization, and **then** the coded data with the unique word is mapped to a signal constellation (i.e., 16 QAM Modulator 32).

FIG. 2a



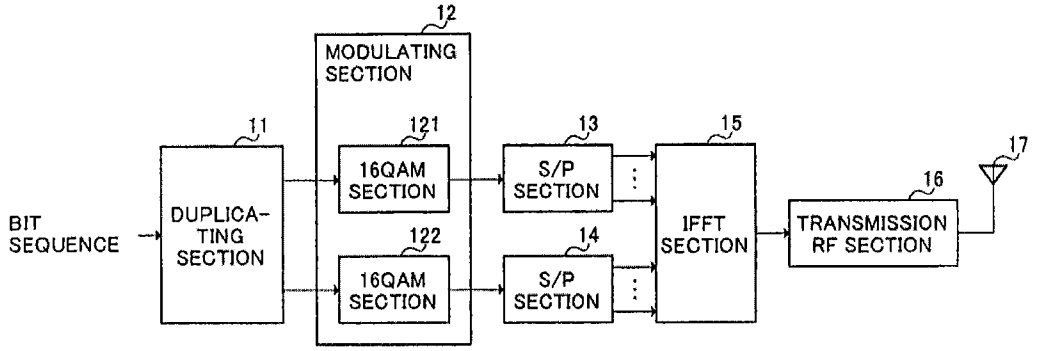
Christodoulides is devoid of any description or suggestion that a physical layer signaling header for a frame is generated based on data streams that have been multiplexed to form a frame synchronization structure. Moreover, because the signal constellation mapping is performed **after** the frame synchronization UW is added to the encoded block, Christodoulides teaches away from the performing the recited step (1) to map a codeword specifying framing information of a frame according to a signal constellation to output a data stream, and **then** performing the recited step (5) to generate a physical layer signaling header for a frame based on data streams that have been multiplexed to form a frame synchronization structure.

Applicants also note that Christodoulides further teaches away from the method of Claim 1 by teaching that frame synchronization is carried out using the frame synchronization UW added to the coded data. A possible motivation for the method of Claim 1 of splitting of the data stream, modifying one of the data streams, and multiplexing the modified and unmodified data streams prior to transmission is to avoid the need for the transmitter to necessarily include frame synchronization UW overhead such as that used by Christodoulides.

Consequently, Applicants submit that Christodoulides teaches away from steps (1) and (5) of amended Claim 1.

The Final Office Action on page 5 contends that Mowbray teaches the claimed step (2) of duplicating and demultiplexing the data stream into a first data stream and a second data stream. However, Mowbray's data streams are *not* the same as each other. Mowbray et al. discloses a system in which a data packet is transmitted by dividing it into sub-packets, for example by distributing successive bytes of the data packet to different sub-packets each containing at most p_n -1 symbols, where p is a prime number, and transmitting the sub-packets along two or more respective paths. (Mowbray, Abstract and Fig. 1) Accordingly, the first and second data streams contain divided portions of successive bytes of data packet and, therefore, the streams contain different data. Mowbray does not teach or suggest that the data stream is duplicated and multiplexed into a first data stream and a second data stream that are the same as each other. Consequently, Mowbray does not does not teach or suggest step (2) of amended Claim 1.

The Final Office Action on page 5 contends that Miyoshi teaches "demultiplexed packets or duplicate packets, and the constellation (such as BPSK) is independent of the modulation scheme of the frame (Fig. 1, 19; ...)". Applicants respectfully note that the argument in the Final Office Action does not track any recitations of Claim 1. Although Miyoshi teaches in Fig. 1 (below) and elsewhere that a bit sequence is duplicated (i.e., Duplicating Section 11), Miyoshi teaches that the duplicated bit sequences are mapped to separate signal constellations (i.e., 16QAM Sections 121 and 122).



Accordingly, Miyoshi operates oppositely to the claimed steps (1) and (2) by duplicating the bit sequence and **then** mapping the duplicated bit sequences to separate signal constellations. Miyoshi therefore teaches away from the claimed steps (1) and (2).

The Final Office Action on page 5 contends that Raleigh teaches steps (3) and (4) of Claim 1, referring to Fig. 2 among others. However, referring to Fig. 2 (below), Raleigh teaches that two entirely different data streams (i.e., in-phase "I data" and quadrature "Q data")

are separately mapped to signal constellations (i.e., PAM Constellation Maps 220a and 220b) to form two entirely different output data streams.

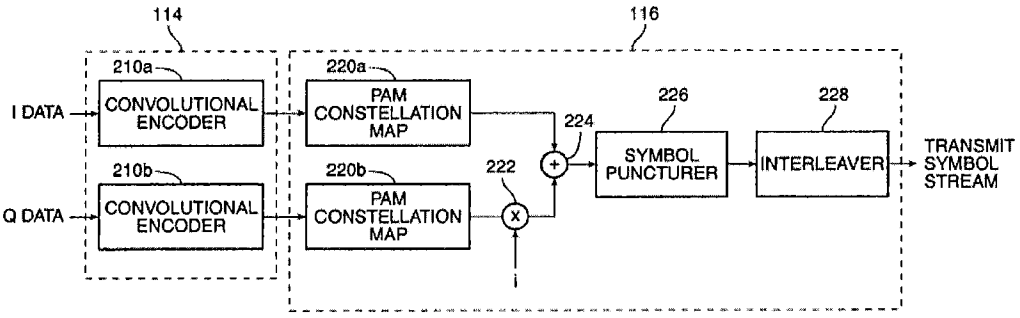


FIG. 2

Accordingly, although Raleigh teaches that the quadrature data stream is multiplied by a constant "i", that quadrature data stream is not the same as the in-phase data stream. Moreover, the quadrature data stream and the in-phase data stream are not generated by mapping a word, much less a codeword specifying framing information of a frame, to a signal constellation. Raleigh also teaches that the quadrature data stream and the in-phase data stream are added (i.e., summer 224). Raleigh does not teach or suggest that a modified first data stream, which was the same as the second data stream before modification, is multiplexed with the second data stream to form a frame synchronization structure in the multiplexed data streams.

Consequently, Applicants submit that Raleigh does not teach or suggest steps (3) and (4) of amended Claim 1.

Independent Claim 12 is an apparatus claim that has been amended to correspond to the method of Claim 1.

Amended Claims 1 and 12 are submitted to be patentable over Christodoulides in view of Mowbray, Miyoshi, and Raleigh because the cited combination does not disclose all claimed steps/features and, moreover, at least Christodoulides and Miyoshi teach away from the claimed steps/features.

III. Independent Claims 5, 6, 16 and 17 are Patentable:

Independent Claims 5, 6, 16, and 17 recite, *inter alia*, similar mapping, duplicating, multiplexing, and outputting steps/features as recited in Claim 1. The Final Office Action on pages 7-8 has referred to its findings made for Claim 1 as to where these features are allegedly

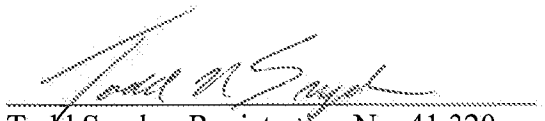
disclosed by the cited references. Applicants therefore submit that independent Claims 5, 6, 16, and 17 are patentable for at least the reasons explained above for Claim 1.

IV. Conclusion:

Therefore, the present application, as amended, overcomes the rejections of record and is in condition for allowance. Favorable consideration is respectfully requested. If any unresolved issues remain, it is respectfully requested that the Examiner telephone the undersigned attorney at (310) 964-0560 so that such issues may be resolved as expeditiously as possible.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-0383 and please credit any excess fees to such deposit account.

Respectfully Submitted,



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